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Strengthening Faculty Capacity and Academic Collaboration through Benchmarking and Biodiversity Studies

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Abstract

Internationalization of higher education and capacity building for academic staff are strategic efforts to enhance institutional quality, global competitiveness, and societal impact. This community engagement program aimed to strengthen academic collaboration between Universitas Palangka Raya (UPR), Indonesia, and Universiti Kebangsaan Malaysia (UKM) through benchmarking activities, academic discussions, and field studies at the Bangi Botanical Garden. The program was implemented from 7 to 11 December 2025 using an Asset-Based Community Development (ABCD) approach that emphasized identifying, mobilizing, and optimizing institutional assets, including academic expertise, research facilities, and biodiversity resources. Data were collected through institutional coordination, interdisciplinary academic dialogues, field observations, and reflective evaluation. The results indicate improved lecturers' understanding of international academic practices, research-based curriculum development, and the utilization of botanical gardens as living laboratories for education, research, and community engagement. The program generated impacts in the form of strengthened international academic networks, enhanced academic staff capacity, increased opportunities for collaborative research and green entrepreneurship, and reinforced implementation of the three pillars of higher education (Tri Dharma Perguruan Tinggi) in support of sustainable development.

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INTRODUCTION

The internationalization of higher education has increasingly become a strategic global agenda aimed at enhancing academic quality, graduate relevance, and institutional competitiveness at both regional and international levels. Altbach & Knight (2007) and Knight (2013) emphasize that internationalization should not be narrowly interpreted as student and staff mobility alone but rather as a systematic process of integrating international, intercultural, and global dimensions into the core functions of higher education institutions. In this context, universities play a critical role as global knowledge producers, contributing to sustainable development and societal well-being.

Rapid globalization, the rise of a knowledge-based economy, and the growing complexity of social and environmental challenges have compelled universities to strengthen cross-border collaboration. International partnerships have been shown to enhance teaching quality, research productivity, and institutional visibility through joint publications and academic capacity development (Li et al., 2020; Monroe et al., 2018; Woo et al., 2021). Consequently, benchmarking activities and inter-institutional academic dialogues are widely recognized as effective strategies for transferring best practices in higher education management.

Within the Southeast Asian context, higher education institutions face increasing pressure to harmonize quality standards, enhance graduate competitiveness, and strengthen research relevance to regional issues. Universities are therefore expected to actively engage in ASEAN academic networks through mutually beneficial collaborations. Roos and Guenther (2020) and Zhao et al. (2022) argue that regional internationalization serves as a crucial pathway for universities in developing countries to enhance institutional capacity and global reputation while maintaining local relevance.

Universitas Palangka Raya (UPR), as a public university located in Central Kalimantan, holds a strategic mandate in human resource development and the sustainable management of tropical natural resources. Kalimantan is globally recognized as a biodiversity hotspot; however, it has experienced significant environmental pressures due to deforestation, land-use change, and climate change. These conditions necessitate a stronger role for universities in producing graduates and research outputs oriented toward environmental sustainability and community well-being (Hope & Allen, 2012; Neves, 2024). Accordingly, strengthening the academic capacity of UPR lecturers is a prerequisite for ensuring impactful education, research, and community engagement.

One effective strategy for academic capacity building is international collaboration with reputable universities. Universiti Kebangsaan Malaysia (UKM) is a leading research university in the ASEAN region with extensive experience in research-based higher education management, international curriculum development, and interdisciplinary academic collaboration. UKM is also widely recognized for its leadership in green campus initiatives and sustainability-oriented education (Mace et al., 2018; Mothes et al., 2020).

Academic visits to UKM extended beyond institutional benchmarking and faculty-level discussions to include field studies at the Bangi Botanical Garden, one of UKM's flagship facilities. Botanical gardens play a strategic role as centers for biodiversity conservation, experiential learning, and multidisciplinary research. Crane et al., (2019); Tran et al., (2021) highlight that modern botanical gardens function as scientific resource centers that bridge education, research, and community engagement, a view further reinforced by Zen (2017), who describe botanical gardens as living laboratories for contextual learning and sustainable research.

The international value of this program was further strengthened by the simultaneous presence of a research team from China conducting biodiversity-related studies at the Bangi Botanical Garden. This multinational interaction fostered rich academic exchange, particularly in research methodologies, tropical flora conservation, and the use of botanical gardens as collaborative research hubs. Such interactions exemplify activity-based internationalization as conceptualized by Maranisya et al. (2025) and Tran et al. (2021)

Based on these considerations, this community engagement program, conducted through benchmarking, academic discussions, and biodiversity field studies at UKM, was designed to strengthen lecturers' capacity at UPR, enhance institutional quality, and promote sustainable international collaboration in higher education and environmental conservation.

METHODS

This community engagement program adopted an Asset-Based Community Development (ABCD) approach, emphasizing the identification, mobilization, and optimization of institutional and environmental assets. The program was conducted from 7–11 December 2025 through three main phases: preparation, implementation, and evaluation. In this program, UPR acted as the initiating and sending institution, focusing on enhancing the capacity of its academic staff. Meanwhile, UKM served as the host and partner institution, providing academic resources, best practices, and field-based learning environments.

The participants consisted of lecturers and academic staff from multiple faculties at UPR. They were selected based on their active involvement in teaching, research, and community engagement, as well as their need to strengthen competencies in international academic practices and the utilization of biodiversity-based learning resources.

To ensure the program's effectiveness, measurable targets, indicators, and evaluation methods were established in Table 1.

Table 1 Program targets, indicators, and measurement methods

No	Program Targets	Indicators	Measurement Methods
1	Improvement of academic staff competence	Increased understanding of international academic practices and research-based learning	Pre- and post-activity reflections, discussion summaries, qualitative analysis
2	Strengthening international collaboration	Availability of MoU/MoA drafts and joint research plans	Document analysis (MoU/MoA drafts), identified research themes
3	Utilization of biodiversity as academic assets	Ability to integrate botanical garden resources into teaching and research	Field reports, observation documentation, implementation plans
4	Development of sustainable academic programs	Initiation of follow-up programs (exchange, seminars, publications)	Number and type of planned follow-up activities

Program Outputs and Evaluation Criteria

In addition to the predefined targets and indicators, the program established specific outputs as measurable outcomes to evaluate its effectiveness. These outputs were used as key evaluation criteria to assess both the process and impact of the community engagement activities. The expected outputs included (1) a comprehensive community engagement report; (2) draft Memoranda of Understanding (MoU) and Memoranda of Agreement (MoA); (3) identified collaborative research themes and joint publication opportunities; (4) enhanced academic capacity and international exposure of participants; and (5) dissemination of program outcomes within the academic community of Universitas Palangka Raya. The achievement of these outputs was measured through document analysis, participant reflections, and verification of follow-up plans, ensuring that both tangible and intangible outcomes were systematically evaluated.

RESULTS AND DISCUSSION

Preparation Phase: Internal Coordination and Team Discussion

The community engagement program began with an intensive preparation phase conducted at UPR. This stage involved a series of internal coordination meetings and team discussions to align program objectives, identify institutional needs, and map available academic assets in accordance with the ABCD approach.

During these discussions, the UPR team formulated key focus areas, including international academic collaboration, research-based curriculum development, and the

utilization of biodiversity resources as educational assets. Participants were also selected based on their academic roles and relevance to the program objectives. In addition, the team prepared presentation materials, discussion frameworks, and field observation guidelines to ensure effective engagement during the benchmarking activities. This preparation phase played a crucial role in strengthening participants' readiness and ensuring the program was implemented in a structured, goal-oriented manner.

Implementation Phase: Benchmarking Activities and Academic Exchange

The implementation phase was carried out at UKM through a series of structured benchmarking activities. The program began with an official reception by UKM representatives, followed by institutional profile presentations and academic discussions involving lecturers and researchers from both institutions. These discussions facilitated knowledge exchange on higher education governance, research management, and innovative teaching practices. Participants also conducted visits to laboratories and academic facilities to directly observe best practices in teaching and research implementation.

A key component of the benchmarking activity was the field study at the Bangi Botanical Garden, where participants examined biodiversity management, plant collections, and the integration of botanical resources into education and research. This activity highlighted the role of botanical gardens as living laboratories that support experiential learning and community engagement. Documentation evidence of these activities includes photographs of institutional meetings, academic discussions, facility visits, and field observations at the botanical garden. Figure 1 records support the validity of the program implementation and demonstrate active participation and engagement of all stakeholders.

Figures 1 Documentation of program presentation

Evaluation Results Based on Program Indicators

Based on the indicators presented in Table 1, the program achieved its intended outcomes. Participants demonstrated improved understanding of international academic practices and research-based learning, as reflected in post-activity discussions and reflections. In terms of collaboration, the program resulted in the preparation of initial MoU/MoA drafts and the identification of potential joint research topics, indicating strengthened institutional partnerships between UPR and UKM. Furthermore, participants showed increased capacity to utilize biodiversity resources as academic assets, particularly in integrating botanical garden functions into teaching, research, and community service. Finally, the program generated sustainable follow-up plans, including academic exchanges, joint seminars, and collaborative publications, ensuring the initiative's continuity and long-term impact.

Profile of the Bangi Botanical Garden

The Bangi Botanical Garden at UKM serves as a conservation and educational area comprising permanent forest reserves, herbal gardens, fern collections, and diverse tropical plant species. The area is actively utilized for field-based learning, biodiversity research, and environmental education.

Profile of the Bangi Botanical Garden

The Bangi Botanical Garden at UKM serves as a conservation and educational area comprising permanent forest reserves, herbal gardens, fern collections, and diverse tropical plant species. The area is actively utilized for field-based learning, biodiversity research, and environmental education**.** One of the key field findings was the presence of leafy vegetable crops belonging to the Brassicaceae family (Figure 2a), which are cultivated under controlled conditions using container-based planting systems. These plants are widely utilized as healthy food sources and serve as a practical example of small-scale sustainable agriculture within the university environment. The cultivation of food crops within the botanical garden reflects UKM's strategic role in integrating food security, urban agriculture education, and research-based green innovation.

Figure 2a. Leafy vegetable crops (*Brassicaceae* sp.) cultivated at the Bangi Botanical Garden, Universiti Kebangsaan Malaysia, as part of sustainable agriculture education.

In addition, large fern species resembling tree ferns from the family Cyatheaceae were identified (Figure 2b). Tree ferns represent an ancient group of plants with high scientific value for studies in plant evolution, tropical forest ecology, and biodiversity conservation. Their presence further reinforces the function of the Bangi Botanical Garden as a natural laboratory for botanical education, taxonomy, and ecological studies.

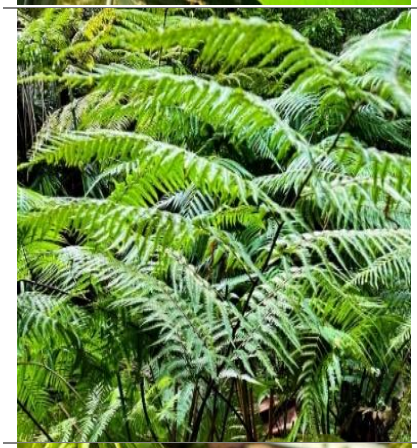

Figure 2b. Tree ferns (family *Cyatheaceae*) at the Bangi Botanical Garden serving as conservation objects and learning resources for botanical studies.

Another notable finding was the presence of club mosses or wire ferns from the family Lycopodiaceae (Figure 2c), characterized by their distinctive morphology resembling fine green microstructures. These plants possess high aesthetic value and potential as ornamental species, while also holding symbolic significance in the conservation of ancient plant lineages. In several research contexts, Lycopodiaceae species are also investigated for their potential applications in pharmacology and biotechnology.

Figure 2c. Club moss (*Lycopodiaceae* sp.) with unique morphology, demonstrating potential as an ornamental plant and as a botanical research object at UKM.

Development of Value-Added Products Based on Biodiversity

One of the best practices observed at UKM is the downstream utilization of research outputs and biological resources through the development of value-added products. Herbal plants, ornamental ferns, and other botanical derivatives are processed and developed into commercial ornamental plants, educational materials, and supporting products for scientific tourism. This approach aligns with the concept of campus-based entrepreneurship, which integrates research, education, and economic innovation (Li et al., 2023).

This management model demonstrates that biodiversity conservation does not inherently conflict with economic value; instead, both objectives can be mutually reinforcing when managed sustainably and grounded in scientific knowledge. UKM's practices in producing and marketing products derived from local plant resources offer valuable insights for UPR in developing similar initiatives that align with Kalimantan's rich biodiversity potential.

Academic and Community Engagement Implications

The utilization of biodiversity as a foundation for learning, research, and economic innovation has strategic implications for the implementation of the three pillars of higher education (*Tri Dharma Perguruan Tinggi*). The integration of conservation, education, and green entrepreneurship strengthens universities' role as key agents of sustainable development.

The use of botanical gardens as experiential learning platforms offers a transferable model that UPR can adapt, particularly for managing campus green spaces and educational forests. Integrating education, research, and community engagement based on biodiversity has the potential to enhance academic relevance, research impact, and social contributions of higher education institutions (Crane et al., 2019; Wang et al., 2019).

Achievement and Benefits of Program Outputs

The program outputs were successfully achieved and demonstrated both tangible and intangible impacts. First, a comprehensive community engagement report was produced as formal documentation of the program, providing a reference for institutional learning and future program replication. Second, the development of draft Memoranda of Understanding (MoU) and Memoranda of Agreement (MoA) documents marked a concrete step toward strengthening academic collaboration between UPR and UKM, ensuring the sustainability of international partnerships. Third, identifying collaborative research themes and joint publication opportunities expanded the scope of academic engagement and opened pathways for future international scholarly contributions. Fourth, the program significantly enhanced participants' academic capacity and international exposure, as evidenced by their improved understanding of global academic practices, research integration, and innovative learning approaches. This benefit directly supports professional development and institutional competitiveness. Finally, the dissemination of program outcomes within the UPR academic community contributed to broader institutional impact by sharing knowledge, promoting best practices, and encouraging wider participation in international academic activities. Overall, these outputs not only reflect the successful implementation of the program but also provide long-term benefits, including strengthened institutional collaboration, improved academic quality, and increased readiness for global engagement**.**

Program Benefits

For UPR, this program contributes to improved teaching quality, strengthened internationalization, and expanded opportunities for collaborative research. For UKM, the program broadens its academic network within the ASEAN region. For the broader

community, enhanced institutional capacity of higher education institutions contributes to improved educational quality, innovation, and environmental awareness.

Program Documentation

Program documentation includes photographic records of activities, official agendas, assignment letters, and meeting minutes, serving as evidence of accountability and transparency in implementing the community engagement program.

CONCLUSION

This community engagement program, conducted through benchmarking activities, academic discussions, and field studies at UKM, demonstrates that academic staff capacity building and higher education internationalization can be implemented in an integrated and sustainable manner. The program significantly enhanced the insights of lecturers from UPR regarding best practices in higher education governance and management, while simultaneously expanding international academic networks.

The achievement of program outputs further confirms its effectiveness. A comprehensive community engagement report was successfully produced as formal documentation and a reference for future program development. In addition, draft MoU and MoA were developed as concrete steps toward institutionalizing collaboration between UPR and UKM. The program also identified collaborative research themes and opportunities for joint publications, providing a foundation for future international academic contributions.

Moreover, the program significantly improved the academic capacity and international exposure of participating lecturers, particularly in understanding global academic practices, research integration, and innovative learning approaches. The dissemination of program outcomes within the UPR academic community further extended its impact by promoting knowledge sharing and encouraging broader participation in international academic activities.

Field findings from the Bangi Botanical Garden highlight the strategic role of botanical gardens as living laboratories that integrate biodiversity conservation, experiential learning, and the development of economically valuable products. This integrated management model is highly relevant for replication at UPR, particularly within the context of Kalimantan, a region characterized by exceptionally rich biodiversity.

Furthermore, the involvement of academics from UPR and UKM, along with a research team from China, strengthened the program's international dimension and created opportunities for regional research collaboration and academic development. As a follow-up, the partner institutions plan to formalize cooperation through MoU/MoA finalization, initiate joint research and publication projects, design lecturer and student exchange programs, and organize collaborative international seminars and community-based sustainability initiatives.

Despite its positive outcomes, several challenges were identified, including limited implementation time, differences in institutional schedules, and varying levels of participants' prior experience in international collaboration. Therefore, future programs are recommended to extend activity duration, strengthen pre-program preparation, and implement more structured monitoring and evaluation systems with measurable indicators. Overall, the program not only supports the effective implementation of the three pillars of higher education (*Tri Dharma Perguruan Tinggi)* but also demonstrates measurable outputs and sustainable impacts, providing a strong foundation for long-term international cooperation and academic development.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTION STATEMENT

All authors contributed substantially to the conception and design of the community engagement program. The first author was responsible for program coordination, implementation, data collection, and manuscript preparation. The co-authors contributed to institutional coordination, academic discussions, field observations, data analysis, and critical revision of the manuscript. All authors have read and approved the final manuscript.

AI DISCLOSURE STATEMENT

The author used ChatGPT (OpenAI) during the preparation of this manuscript for language enhancement, grammar checking, content organization, and drafting assistance. The use of artificial intelligence was limited to supporting the writing process and improving the clarity of the manuscript. All research activities, including study design, data collection, data analysis, interpretation of results, and formulation of conclusions, were conducted independently by the author. Furthermore, all data presented in this study are authentic data obtained directly from the research site and were not generated, modified, or fabricated using artificial intelligence tools. After using the AI tool, the author carefully reviewed, revised, and validated the manuscript and assumes full responsibility for the accuracy, integrity, and content of this publication.

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